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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/709,212

04/21/2004

Qiming Li

20.2886

3211

23718

7590

08/08/2006

SCHLUMBERGER OILFIELD SERVICES  
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EXAMINER

WHITTINGTON, KENNETH

ART UNIT

PAPER NUMBER

2862

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No. 10/709,212	Applicant(s) LI ET AL.	
	Examiner Kenneth J. Whittington	Art Unit 2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above claim(s) 40-71 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☒ Claim(s) 10-39 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

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**DETAILED ACTION**

***Response to Arguments***

Applicant's arguments filed July 3, 2006, with respect to the rejections of the claims 1-9 under Gianzero et al.

(US4,980,643) and the combination therewith have been fully

6 considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Bittar (US6,476,609) as noted below.

***Claim Rejections - 35 USC § 102***

12 (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

18

Claims 1-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Bittar. Regarding claim 1, Bittar discloses a geo-steering method and apparatus comprising:

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disposing within a borehole a logging instrument equipped with at least first transmitter and receiver antennas spaced apart by a first distance, at least one of the first antennas having a tilted magnetic dipole with respect to the longitudinal

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axis of the instrument, the antennas being oriented about the axis of the logging instrument such that the at least one tilted magnetic dipole corresponds to a first azimuthal angle (See Bittar FIGS. 1, 7 and 15-20, note transmitters T1-Tn and receivers R1 R2);

6 azimuthally-rotating the logging instrument within the borehole and while the logging instrument is rotating, activating the first transmitter antenna to transmit electromagnetic energy into the formation; while the logging instrument is rotating (See col. 15, line 36 to col. 16, line 18 and col. 7, line 30 to col. 9, line 35),

12 directionally measuring the first voltage signals associated with the transmitted electromagnetic energy using the first receiver antenna, as a function of the azimuthal orientation of the logging instrument, so as to determine the azimuthal variation of the measured first voltage signals (See col. 9, line 36 to col. 11, line 58); and

18 fitting the azimuthal variation of the measured first voltage signals to approximate functions (See col. 11, line 59 to col. 12, line 49).

Regarding claim 2, the fitting step is executed while the first voltage signals are being measured (See col. 11, line 59 to col. 12, line 49).

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Regarding claim 3, the fitting is stopped when convergence has been achieved (See col. 11, line 59 to col. 12, line 49).

Regarding claim 4, the activating, measuring, and fitting steps are repeated to execute subsequent acquisition cycles (See col. 11, line 59 to col. 12, line 49, note also that Bittar  
6 discloses moving through multiple formations and thus the apparatus and method is usable for subsequent cycles).

Regarding claims 5 and 6, the fitting functions are sinusoids defined by coupling components of the first transmitter antenna's magnetic dipole and first receiver antenna's orientation vectors and the coefficients of the  
12 fitting components are functions of earth formation parameters including at least one of resistivity of formation beds, location of the logging instrument, borehole deviation, azimuth angle at the location of the logging instrument, and a combination thereof (See col. 11, line 59 to col. 12, line 49).

Regarding claim 7, the fitting coefficients include  
18 constant, sine, cosine, double angle sin and double angle cosine terms that define an iterative fitting algorithm useful for determining the azimuthal dependence of the directional measurements (See col. 9, line 36 to col. 11, line 58).

Regarding claim 8, the iterative fitting algorithm is used for selected real-time directional measurements having utility

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in geo-steering (See col. 11, line 59 to col. 12, line 49 and col. 15, line 36 to col. 16, line 18).

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not  
6 included in this action can be found in a prior Office action.

Claim 9 is rejected under 35 U.S.C. 103(a) as being  
unpatentable over Bittar in view of Minerbo et al. (US  
6,304,086), hereinafter Minerbo. Regarding this claim, Bittar  
teaches the features noted above except for the use of a Fourier  
transform. Minerbo teaches use of a Fourier transform in  
12 induction logging applications (See Minerbo col. 5, line 57 to  
col. 15, line 38). It would have been obvious to use a Fourier  
transform in the processing of Bittar. One having ordinary  
skill in the art would have been motivated to do so to reduce  
the complexity of equations to a usable form as noted by Minerbo  
at col. 7, lines 45-49 and further it is well known in the art  
18 to use a Fourier transform to derive a set of equations with  
coefficients representing desired characteristics.

***Allowable Subject Matter***

Claims 10-39 are objected to as being dependent upon a  
rejected base claim, but would be allowable if rewritten in

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independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: these claims are allowable for the same reasons as contained in the Office Action mailed April 4,

6 2006.

### **Conclusion**

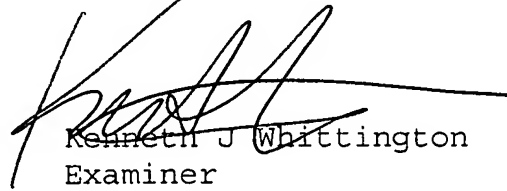
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Whittington whose telephone number is (571) 272-2264. The  
12 examiner can normally be reached on Monday-Friday, 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is


18 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Kenneth J. Whittington  
Examiner  
Art Unit 2862

kjw

  
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SUPERVISORY PATENT EXAMINER  
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